THIRD EDITION Eff. 3-1-56



Reference Guide for TELEVISION PICTURE TUBES

This CBS Reference Guide for Television Picture Tubes lists, to the best of our knowledge, all magnetically deflected picture tubes to date — monochrome or color — regardless of make. Basing diagrams and pertinent data for 258 tubes are presented in easy-to-use form. As an additional aid to the television serviceman, bold-face type highlights the important characteristics that differ among similar tube types having different suffix letters, such as 20DP4, A, B, and C.

MONOCHROME SECTION

			Philips .	Deflec-		- 367	Service Service		Min.	100	Capacitance		10000	Mex.	Ratings†		Typical Operat	ion and Ch	procteristics	W. Salvaria	
				tion		7.33	Max.	Max.	Useful		(449)			Applied	Voltages		Applied Voltages			Focusing	100
Type No.	Face-plate Description (See Notes)	Envelope	Screen	Angle (Ap- prox.)	Focusing	Basing	Over-all Length (in.)	Diameter or Ht.xWd. (in.)	Dlam. er Ht.xWd. (in.)	Max. Nock Longth	Bulb Coating and Anode Min. Max.	Bulb Contact	len Trap	Anodo	Grid No. 2	Anode	Focusing Electrode	Orld No. 2	Grid No. 1 (Visual Cut-off)	Coll Current (ma.) (approx.)	No.
3NP4 5ACP4 5AXP4 5AXP4 5FP4A 5GP4 5GP4 5GP4A 5TP4 7AP4 7CP4 7DP4 7HP4	C, S, Ro C, S, S, Ro	Glass Glass Glass Glass Glass Glass Glass Glass Glass Glass Glass	Alum. Alum. Alum. Alum. Alum. Alum.	42° 53° 53° 50° 53° 53° 53° 53° 55° 55° 57° 50° 50°	Magnetic Electro. Auto-Electro. Electro. Magnetic Magnetic Electro. Electro. Electro. Electro. Electro. Magnetic	5BV 8EQ 12S 12AA 5AN 5AN 5AN 5AN 12C 5AJ 8BQ 12R 12N	10% 11½ 11 12% 11½ 11½ 11½ 11½ 11½ 11½ 13% 13% 13%	213/6 5/52 5/52 5/52 5/52 5/52 5/52 5/52 5/	Projection Type 41/4 41/4 Projection Type 41/4 41/4 41/2 Projection Type 6 61/2 6 515/6	734 714 83/32 711/16 711/16	275-375 No Coating No Coating	Cavity Cable Ball Ball	None None None None None None None None	25,000 18,000 18,000 40,000 8000 12,000 12,000 27,000 3500 8000 8000 8800	410 500 400 410 410 700 350 No Grid 410 410 450	24,000 12,000 14,000 36,000 6,000 10,000 27,000 3500 6000 6000 6000	900 6650 to 8100 4900 675 1140 1200 to 1650	250 300 200 250 300 300 200 250 250 250	-60 -27 to -63 -28 to -72 -65 -25 to -70 -28 to -72 -28 to 72 -42 to -48 -67 -25 to -70 -27 to -63 -33 to -77	120 — 122 137 137 — — — —	3NP4 5ACP4 5AXP4 5AXP4 5AZP4 5GP4 5GP4 5GP4 7AP4 7CP4 7DP4 7HP4
7NP4 7QP4 7RP4 7TP4 7TP4 7WP4 8AP4 8AP4 9AP4 9CP4 108P4	C, S, Ro C, S, Ro C, S, Ro C, S, Ro C, S, Ro G, S, Ro C, S, Ro C, S, Ro C, S, Ro	Glass Glass Glass Glass Glass Metal Metal Glass Glass	Alum. Alum. Alum. Alum.	35° 52° 50° 50° 35° 54° 54° 40° 50°	Electro. Magnetic Magnetic Electro. Electro. Magnetic Magnetic Electro. Magnetic Magnetic Magnetic Magnetic	14N 12D 12D 12Q 14N 12H 12H 6AL 4AF 12N	201/8 131/4 147/16 131/2 201/16 149/6 213/8 157/8 18	73/6 75/6 75/6 75/6 73/6 811/6 811/6 9/8 9	Projection Type 61/4 6 6 Projection Type 734 73/6 9	10% 71/8 83/8 73/6 73/6 73/6 73/6 89/6 83/8	No Coating	Cap Cavity Cavity Cavity Cap Rim Cap Cap Cap Cavity	None Single None None Single Single None None Double	80,000 10,000 12,000 12,000 80,000 9000 9000 7000 7000 10,000	600 410 410 410 600 No Grid No Grid 250 No Grid 410	75,000 8000 9000 10,000 75,000 7000 7000 7000 7000 9000	16K to 18K 1170 to 1590 16K to 18K 1190to 1790	400-600 300 250 200 400-600 250	-27 to -63 -20 to -60 -100	80 120 115 115 115 90 to 110	7NP4 7QP4 7RP4 7RP4 7TP4 7WP4 8AP4 8AP4A 9AP4 9CP4 108P4
10BP4A* 10BP4C 10BP4D 10CP4 10DP4 10EP4 10FP4 10FP4A 10MP4 10MP4A	G, S, Ro G, S, Ro C, S, Ro C, S, Ro C, S, Ro C, S, Ro G, S, Ro G, S, Ro G, S, Ro	Glass Glass Glass Glass Glass Glass Glass Glass Glass	Alum. Alum. Alum. Alum.		Magnetic Magnetic Magnetic Magnetic Electro. Magnetic Magnetic Magnetic Magnetic Magnetic Magnetic	12N 12N 12N 12N 12N 12M 12N 12N 12N 12S 12G 12G	18 18 18 17 18 18 18 18 1736 1736	10% 10% 10% 10% 10% 10% 10% 10% 10% 10%	9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	836 836 77/16 836 836 836 836 734 734	500-2500 500-2500 500-2500 500 No Coating Has Coating 500-2500 500-2500 500-2500 500-2500	Cavity Cavity Cavity Ball Cavity Ball Cavity Cavity Cavity Cavity Cavity	Double Single Single Double None Double None Double Double		410 410 450 410 410 410 410 No Grid No Grid	9000 9000 9000 9000 9000 8000 9000 9000	2900 ———————————————————————————————————	250 250 250 250 250 250 250 250 250 250	-27 to -63 -27 to -63 -36 to -84 -33 to -77 -27 to -63 -27 to -63 -27 to -63	110 110 115 132 110	108P4A 108P4C 108P4D 10CP4 10DP4 10EP4 10FP4 10FP4A 10MP4 10MP4A
IORP4	C, S, Ro	Glass	Alum.	50°	Electro.	12L.	1694	10%	91/8	71/4	750-1500	Cavity	None	16,000	500	12,000 14,000	-48 to +260 -55 to +300	300	-28 to -72 -28 to -72		10RP4
IOSP4	G, S, Ro C, S, Ro	Glass	Alum.	50°	Electro.	12M 6AL	17 25%	10% 123/16	91/8	7%	No Coating	Cavity	None None	14,000 7000	410 300	12,000 14,000 7000	1400 to 1900 1640 to 2225 1190 to 1790	200 200 250	-18 to -48 -18 to -48 -27 to -63	=	105P4
12CP4 12JP4 12KP4 12KP4A 12KP4A	C, S, Ro C, S, Ro C, S, Ro C, S, Ro	Glass Glass Glass Glass Glass	Alum. Alum.	50° 54° 54° 54°	Magnetic Magnetic Magnetic Magnetic Magnetic	4AF 12D 12N 12N 12N	1858 18 18 18 191/8	121/16 123/16 129/16 129/16 129/16	10 10 111/4 111/4	8 71/4 75/16 75/16 87/16	No Coating No Coating 500-2500 500-2500 750-3000	Cap Ball Cavity Cavity Cavity	None None None None Double	7000 12,000 12,000 12,000	No Grid 410 410 410 410	7000 10,000 11,000 11,000 11,000	= - /	250 250 250 250 250 250	-110 -27 to -63 -27 to -63 -27 to -63	146 135 135 110	12AP4 12CP4 12JP4 12KP4 12KP4A 12LP4

Children of	SCHOOL STATE	(690)	-	S. L	Walter T	614 T	15 KW 1	Comparing the Land		100	OCONOCE.	1000		Max.	Ratings†	Side and the same of	Typical Operation	on and Ch	aracteristics	3	HONE !
147		C15424		Deflec-	N Nikoladia Nikoladia	SP-	E1284	Max.	Min. Useful		Capacitance (µµf)	EST !	100	Applied	Voltages	A LONG TO STATE OF THE STATE OF	Applied Voltages	730	mar Phys	Focusing	SCHOOL STORY
Type No.	Face-plate Description (See Notes)	Envelope	Screen	Angle (Ap- prox.)	Facusing	Basing	Max. Over-all Length (in.)	Diameter or Ht.xWd. (in.)	Screen Diam. or Ht.xWd. (in.)	Max. Neck Length	between Bulb Coating and Anode Min. Max.	Bulb Contact	ion Trop	Anode	Grid No. 2	Anode	Focusing Electrode	Grid No. 2	Grid No. 1 (Visual Cut-off)	Coil Current (ma.) (approx.)	Type No.
12LP4A* 12LP4C 12GP4 12GP4 12RP4 12RP4 12TP4 12UP4 12UP4 12UP4B 12VP4	G, S, Ro G, S, S, Ro G, S, S, Ro G, S, S, Ro C, S, S, Ro C, S, S, Ro G, S, S, Ro G, S, S, Ro G, S, S, Ro	Glass Glass Glass Glass Glass Metal Metal Metal Glass	Alum	54° 54° 55° 55° 56° 54° 54° 54° 54° 55°	Magnetic	12N 12N 12D 12D 12D 12D 12D 12D 12D 12D 12D	19/8 19/8 17/8 17/8 18/8 19/8 19 19 19 19	121/2 121/2 129/16 129/16 121/2 121/2 121/2 121/2 121/2	11 11 11 11 11 11 11 11 11 11 11 11 11	87/16 87/16 73/16 73/16 71/4 87/16 81/16 81/16 81/16 711/16	750-3000 750-3000 No Coating No Coating No Coating No Coating No Toating	Cavity Cavity Ball Ball Cavity Rim Rim Rim Cavity	Double Double Single Single Single Double Double Single Double	12,000 12,000 12,000 12,000 12,000 12,000 12,000 12,000 12,000 12,000	410 410 410 410 410 410 410 410 410 No Grid	11,000 11,000 10,000 10,000 10,000 11,000 11,000 11,000 11,000 11,000 11,000		250 250 250 250 250 250 250 250 250 250	-27 to -63 -27 to -63 -33 to -77 -27 to -63 -27 to -63 -27 to -63 -27 to -63 -27 to -63 -27 to -63 -27 to -63 -33 to -77	110 100 135 135 135 110 110 110 110 150	12LP4A 12LP4C 12QP4 12QP4 12RP4 12TP4 12UP4 12UP4 12UP4B 12UP4B
12VP4A 12WP4 12XP4 12XP4 12YP4 12ZP4 12ZP4A 14BP4A 14CP4* 14DP4	G, S, Ro G, S, Ro G, S, Ro C, S, Ro C, S, Ro G, S, Ro G, S, Ro G, S, Re G, S, Re	Glass Glass Glass Glass Glass Glass Glass Glass Glass	Alum. Alum.	55° 55° 55° 54° 54° 54° 65° 65° 65°	Magnetic Magnetic Magnetic Auto-Electro. Magnetic Magnetic Magnetic Magnetic Magnetic Magnetic	12G 9CH 12N 12N 12N 12N 12N 12N 12N 12N	1836 18 181/2 191/8 18 173/16 173/16 173/16	12½ 12½ 12½ 12½ 12½ 12½ 12½ 91½ 91½ 91½ 91½ 91½ 92½ 92½ 92½ 92½ 92½ 12½ 92½ 12½	11 111/4 81/4 111/4 111/4 111/4 111/4 111/4 111/4 1	711/16 79/52 71/2 87/16 75/16 75/16 75/16 723/52 723/52 721/52 721/52	750 - 3000 750 - 2000 2000 750 - 3000 500 - 2000 500 - 2000 500 - 2000 500 - 2000 750 - 2000 No Coating	Cavity Special Cavity Cavity Cavity Cavity Cavity Cavity Cavity Cavity Cavity	Double Single Not Ind. Single Single Single Single Single Single Double	12,000 12,000 9000 12,000 12,000 12,000 14,000 14,000 14,000 14,000	No Grid No Grid 350 410 410 410 410 410 410 410	11,000 10,000 8000 11,000 11,000 11,000 11,000 11,000 12,000 11,000	99 A 1 100 M	250 250 250 250 250 250 250 250 250 300 250	-33 to -77 -27 to -63 30v. change -33 to -77 -27 to -63 -27 to -63 -27 to -63 -27 to -63 -33 to -72 -27 to -63	150 Not Spec. Not Ind. 	12VP4 12WP4 12XP4 12YP4 12ZP4 12ZP4 14BP4 14CP4 14DP4
14EP4 14FP4 14GP4 14HP4 14KP4 14KP4 14KP4 15CP4 15CP4 15DP4 15EP4	G, S, Re G, S, Re F, G, S, Re G, S, Re G, S, Re G, S, Re C, S, Ro C, S, Ro C, S, Ro	Glass Glass Glass Glass Glass Glass Glass Glass Glass Glass		65° 65° 65° 65° 65° 65° 65° 52° 50° 57° 52°	Magnetic Magnetic Electro. Electro. Magnetic Magnetic Electro. Magnetic Magnetic Magnetic Magnetic Magnetic Magnetic Magnetic	12N 12D 12L 12L 12N 12N 12N 12D 12D 12D	167/8 161/2 173/16 173/16 1625/52 167/8 207/8 217/8 207/8 223/4	927/32x1221/32 927/32x1221/32 927/32x1221/32 913/16x1256 927/32x1221/32 927/32x1221/32 927/32x1221/16 1534 1534 1534 157/6	856×1136 856×1132 82×1136 845×1136 845×1136 845×1136 845×1136 1332 1338 14	736 71/16 711/16 711/16 711/16 711/16 71/1	750-2000 No Coating 750-2000 750-2000 500-2000 1200 600-900 No Coating No Coating 500-2000	Cavity Cavity Cavity Cap Cap Cap Cavity Ball Cavity Ball Ball	Single Single Single Single Single Single None Double Single Not Ind.	14,000 14,000 14,000 14,000 10,000 14,000 14,000 15,000 15,000 15,000	410 410 500 410 380 410 500 410 410 410 410 380	12,000 12,000 12,000 9000 12,000 12,000 12,000 12,000 13,000 9000		300 300 300 250 250 250 250 250 250 250 250 250	-33 to -77 -33 to -77 -33 to -77 -20 to -60 30v. change -28 to -72 -27 to -63 -27 to -63 -27 to -63 30v. change	110 115 — — — 159 115 146 Not Ind.	14EP4 14FP4 14GP4 14HP4 14KP4 14KP4 15AP4 15AP4 15CP4 15DP4 15EP4
16ABP4 16ACP4 16AFP4 16AFP4 16AP4A* 16AP4B 16CP4 16DP4	G, S, Re C, S, Ro G, S, Re C, Cy, Re C, S, Ro G, F, S, Ro C, S, Ro C, S, Ro C, S, Ro	Glass Glass Glass Glass Metal Metal Motal Glass Glass	Alum.	65° 60° 65° 65° 53° 53° 53° 52° 60°	Auto-Electro. Auto-Electro. Electro. Electro. Magnetic Magnetic Magnetic Magnetic Magnetic Magnetic Magnetic Magnetic		191/8 211/8 191/6 195/52 225/6 225/6 217/8 21	115/6×143/6 16 111/4×143/6 111/2×143/4 16 16 16 15 15 16 16 16	10½x13½ 15¼ 10½x13½ 10½x13½ 143½ 1436 1436 15 14½ 14½	711/16 81/4 711/16 85/64 75/6 75/6 75/6 715/16	750-1500 2000 750-1500 Has Coating No Coating No Coating No Coating	Cavity Cavity Cavity Cavity Rim Rim Rim Cavity Cavity Cavity	Single Single None Double Double Double Double Double	16,000 14,000 16,000 16,000 14,000 14,000 14,000 15,000 15,000	500 410 410 410 410 410 410 410 410 410 4	12,000-14,000 12,000-13,000 12,000-14,000 12,000 12,000 12,000 12,000 12,000 9000-12,000 9000-12,000		300 250 300 250 300 300 300 300 250 250 250	-33 to -77 -33 to -68 -33 to -77 -27 to -63 -33 to -77 -33 to -77 -27 to -63 -33 to -77 -27 to -63	89 89 89 110 115 115	16ABP 16ACP 16AFP 16AP4 16AP4 16CP4 16DP4
16EP4 16EP4A 16EP4B 16EP4B 16FP4 16GP4B* 16GP4B* 16GP4C 16HP4 16HP4A	C, S, Ro G, S, Ro G, T, S, Ro C, S, Ro G, S, Ro G, F, S, Ro C, F, S, Ro C, F, S, Ro G, S, Ro	Metal Metal Glass Metal Metal Metal Metal Glass Glass		60° 60° 60° 62° 70° 70° 70° 60° 60°	Magnetic	12D 12D 12D 12D 12D 12D 12D 12D 12D 12N 12N	20 20 20 20 20 1711/16 1711/16 1711/16 1711/16 2156 2156	16 16 16 16 16 16 16 16 16 16	1436 1436 1436 15 1436 1436 1436 1438 1442	615/6 615/6 615/6 73/16 7 7 7 7 7 7 89/6 89/16	No Coating	Rim Rim Ball Rim Rim Rim Rim Cavity Cavity	Double Double Single Single Single Single Single Single Double Double		410 410 410 410 410 410 410 410 410 410	12,000 12,000 12,000 12,000 12,000 12,000 12,000 12,000 12,000 12,000 12,000		300 300 300 300 300 300 300 300 300 300	-33 to -77	105 105 105 140 100 100 100 100 110 110	16EP4 16EP4 16EP4 16EP4 16GP4 16GP4 16GP4 16GP4 16HP4
16JP4 16JP4A 16KP4* 16KP4* 16LP4 16LP4A 16MP4 16MP4A 16MP4* 16RP4*	C, S, Ro G, S, Ro G, S, Re G, S, Ro C, S, Ro G, S, Ro G, S, Ro G, S, Ro G, S, Ro G, S, Ro	Glass Glass Glass Glass Glass Glass Glass Glass Glass	Alum	52° 52° 60° 65° 65°	Magnetic	12N 12N 12N 12N 12N 12N 12N 12N 12N 12N	211/8 211/8 19/8 19/8 229/8 229/8 221/8 19/8 19/8	163% 163% 113%×143% 115%×143% 16 16 16 16!4 11!1/16×14!5/16 115%×143%	15 15 10/ex13/2 10/ex13/2 14/2 14/2 14/2 14/2 14/3 10/ex13/4 10/ex13/4 10/ex13/2	711/6 711/6 711/6 711/6 711/6 79/6 79/6 811/6 811/6 811/6	750-2000 750-2000 750-1500 750-1500 1500-3500 1500-3500 1500-3500 No Coating 750-1500	Cavity Cavity Cavity Cavity Cavity Cavity Cavity Cavity Cavity Cavity Cavity Cavity	Double Double Single Single Double Double Double Double Single Single Single	14,000 14,000 16,000 16,000 14,000 14,000 14,000 16,000 16,000	410 410 410 410 410 410 410 410 410 410	11,000 11,000 12,000-16,000 14,000 12,000 12,000 12,000 12,000 14,000 12,000-16,000 12,000-16,000		250 250 300 300 300 300 300 300 250 300 300	-27 to -63 -27 to -63 -33 to -77 -33 to -77 -33 to -77 -33 to -77 -33 to -77 -27 to -63 -33 to -77 -77 -77 to -77 -77 to -77 -77 to -77 -77 to -77	115 115 108 108 110 110 110 110 110 100–150 100	16JP4 16JP4A 16KP4 16KP4 16LP4 16LP4 16MP4 16MP4 16MP4 16RP4

Bold-face type highlights the important characteristics that differ among similar Tube Types having different suffix letters.

NOTES:
All tubes in this section have heater ratings of 6.3 volts and 0.6 ampere. Only tubes that are magnetically deflected are included.

Face-Plate Code: C — clear, Cy — cylindrical, F — frosted, G — gray, Re — rectangular, Ro — round, S — spherical, T — treated.

† Design-center values. *Most commonly used types. #Internal magnetic unit to be used with excernal tubular magnetic shield. \$For rectangular tubes, the horizontal deflection angle is given.



MONOCHROME SECTION

TELEVISION PICTURE TUBES

1800		0	100	Deflec-	C PROBLE		50 1 12	The Later of the l	Min.	1 8	Capacitance	and c	De De	-	Ratings†	25 100 -59	Typical Operation	on and Cha	racteristics	100	1 1
100	Foce-plate		A COUNTY	tion Angle	D. Spring	1	Mox.	Max. Diameter	Useful Screen	Mox.	(µµf)	00 10	100 LBN	Applied	Voltages	10 000	pplied Voltages	3.4	Grid No. 1	Focusing	Type
No.	Description (See Notes)	Envelope	Screen	(Ap- prox.)	Focusing	Basing	Over-all Length (in.)	or Ht.xWd. (in.)	Diam. or Ht.xWd. (in.)	Neck Length	Bulb Coating and Anode Min. Max.	, Bulb Contact	lon Trap	Anode	Grid No. 2	Anode	Focusing Electrode	Grid No. 2	(Visual Cut-off)	(ma.) (approx.)	No.
165P4 165P4A 16TP4* 16UP4 16UP4 16WP4 16WP4 16WP4 16WP4 16YP4 16ZP4	C, S, Ro G, S, Re G, S, S, Ro G, S, S, Ro G, S, S, Ro G, S, Ro G, S, Ro G, S, Ro	Glass Glass Glass Glass Glass Glass Glass Glass Glass Glass		70° 70° 65° 65° 70° 70° 70° 70° 55°	Magnetic	12N 12N 12N 12D 12D 12D 12D 12N 12D 12N 12N	1711/6 1711/6 181/2 185/8 179/6 181/8 191/8 1711/6 225/8	16 16 1156×1436 1156×1436 16 16 16 1156×1436 16	14½ 14½ 10½×13½ 10¾×13¾ 14½ 14½ 14½ 14½ 10¾×13¾ 16 14½ 14½ 14½ 14½	73/6 73/6 71/6 71/6 71/6 71/6 75/6 711/6 73/6 79/6	1500-3500 1500-3500 750-2000 No Coating No Coating 750-1500 No Coating 750-2000 750-1500	Cavity Cavity Cavity Cavity Cavity Cavity Cavity Cavity Cavity Cavity Cavity	Double Double Single Single Double Double Double Single Double	14,000 14,000 14,000 15,000 15,000 15,000 16,000 14,000 16,000	410 400 410 410 410 410 410 410 410 410	12,000 12,000 12,000 12,000 12,000 12,000 12,000 12,000 12,000 12,000 12,000 12,000	17 151101	300 300 300 300 250 250 250 250 250 300 300	-33 to -77 -33 to -77 -33 to -77 -27 to -63 -27 to -63 -27 to -63 -27 to -63 -27 to -63 -33 to -77 -33 to -77	110 110 115 100 110 110 110 110 100 100	16SP4 16SP4/ 16TP4* 16UP4 16WP4 16WP4 16WP4 16XP4 16YP4 16ZP4
17AP4 17ASP4 17ATP4	G, S, Re C, S, Re G, S, Re	Glass Glass Glass	24	65° 65° 85°	Magnetic Magnetic Electro.	12N 12N 12L	19 197/8 161/4	1236×151/2 1236×151/2 1236×151/2	1034×141/4 1034×141/4 1034×141/4	71/16 715/16 71/8	750-2000 1100 750-1500	Cavity Cap Cavity	Single Single Single	16,000 14,000 16,000	410 410 500	12,000 12,000 14,000 12,000	-55 to +300 -50 to +265	300 250 300 300	-33 to -77 30v. change -33 to -77 -33 to -77	Not Ind.	17AP4 17ASP- 17ATP-
17ATP4A 17AVP4	G, S, Re	Glass	Alum.	85°	Electro	12L 12L 12L	16¼ 16 16	1236×151/2 1215/32×159/16 1215/32×159/16	1034×141/4 1034×141/4 1034×141/4	71/8 611/16	750 1500 750 1500 750 1500	Cavity Cavity	Single Single Single	16,000 16,000 16,000	500 500 500	14,000 12,000 12,000 12,000	-55 to +300 -50 to +265 -50 to +350 -50 to +350	300 300 300 300	-33 to -77 -33 to -77 -33 to -77 -33 to -77		17ATP
178P4 178P4 178P4A* 178P4B*	G. S. Re G. S. Re G. S. Re	Glass Glass Glass Glass	Alum	65° 65°	Electro Magnetic Magnetic Magnetic	12D 12N 12N	19% 19% 19%	1238×151/2 1213/32×151/2 1238×151/2	1034×141/4 1034×141/4 1034×141/4	711/16 711/16 711/16	No Coating		Single Single Single	16,000 16,000 16,000	410 410 410	12,000 14,000 14,000	0 = 0	300 300 250	-33 to -77 -33 to -77 -27 to -63	100 100 115	178P4 178P4 178P48
178P4C 17CP4* 17CP4A	G, T , S, Re G, F , S, Re G, S, Re	Glass Metal Metal	Ē	65° 66° 66°	Magnetic Magnetic Magnetic	12N 12D 12D	19% 19 19	1213/32×151/2 123/8×161/16 123/8×161/16	1034x141/4 11x143/6 11x143/6	711/16 73/8 73/8	750-1500	Cavity Rim Rim	Single Single Single	16,000 16,000 16,000	410 410 410	12,000 12,000 12,000 14,000	E	300 300 300 300	-33 to -77 -33 to -77 -33 to -77 -33 to -77	100 96 96 104	178P40 17CP4 17CP4
17FP4	G, S, Re	Glass	-	65°	Electro.	12L	19%	1236×151/2	103/4×141/4	711/16	500-750	Cavity	Single	18,000	410	12,000	2300 to 3100 3100 to 4100	300	-33 to -77	=	17FP4
17FP4A 17GP4* 17HP4* 17HP4A	G, S, Re G, F, S, Re G, S, Re G, T, S, Re	Glass Metal Glass Glass		65° 66° 65° 65°	Electro. Electro. Electro. Electro.	12L 12M 12L 12L	1956 195/16 199/16	1236×151/2 1236×161/6 1236×151/2 1213/32×151/2	1034x141/4 11x145/6 1034x141/4 1034x141/4	711/16 711/16 711/16 711/16	750-2000 750-1500 750-1500	Cavity Rim Cavity Cavity	Single Single Single Single	18,000 16,000 16,000 16,000	500 500 500 500	12,000 12,000 14,000-16,000 14,000-16,000	2170 to 2940 2290 to 3100 -56 to +310 -56 to +310	300 300 300 300	-33 to -77 -33 to -77 -33 to -77 -33 to -77		17FP4/ 17GP4 17HP4 17HP4
17HP48* 17JP4 17KP4 17KP4 17LP4* 17LP4A* 17QP4* 17QP4A* 17RP4 17SP4 17SP4	G, S, Re G, S, Re G, S, Re G, Cy, Re G, Cy, Re G, Cy, Re G, S, Re G, S, Re G, F, S, Re	Glass Glass Glass Glass Glass Glass Glass Glass Glass Metal	Alum.	65° 65° 65° 65°	Electro. Magnetic Auto-Electro. Electro. Magnetic Magnetic Magnetic Electro. Auto-Electro. Electro.	12L 12N 12D 12L 12L 12N 12N 12N 12N 12N 12N	19%6 19%6 19%6 19%6 19%6 19%6 19%6 19%6	1213/2×151/2 1213/2×151/2 123/4×151/2 123/4×151/2 123/4×151/2 123/4×151/2 123/4×151/2 123/4×151/2 123/4×151/2 123/4×151/2 123/4×161/6	11½×14½ 10¾×14½ 10¾×14½ 10¾×14½ 10¾×14½ 10¾×14½ 10¾×14½ 10¾×14½ 10¾×14½ 11¾×14½	711/16 711/16 711/16 711/16 711/16 711/16 711/16 711/16 711/16	750-1500 500-750 1000-1500 750-2000 750-1500 750-1500 750-1500 750-1500 500-750	Cavity Cavity Cavity Cavity Cavity Cavity Cavity Cavity Cavity Rim	Single Single Single Single Single Single Single Single Single Single	16,000 18,000 16,000 16,000 16,000 16,000 16,000 16,000 16,000	500 410 500 500 500 410 500 410 500	14,000 16,000 12,000 12,000 14,000 14,000 14,000 14,000 14,000 14,000 14,000 16,000	-56 to +310	300 300 300 300 300 300 300 300 250 300 300	-28 to -72 -33 to -77 -33 to -77 -33 to -77 -33 to -77 -33 to -77 -28 to -72 -33 to -66 -33 to -77 -33 to -77	100 100 95 	17HP48 17JP4 17KP4 17LP4* 17LP4A 17QP4* 17QP4J 17RP4 17SP4 17TP4*
17UP4 17VP4 17VP4 19AP4 19AP4A 19AP4C 19AP4D 19DP4	G, Cy, Re G, Cy, Re G, Cy, Re C, S, Ro G, F, S, Ro C, F, S, Ro C, S, Ro C, S, Ro C, S, Ro	Glass Glass Glass Metal Metal Metal Metal Metal Glass Glass	Alum.	70° 66° 65° 66° 66° 66° 66° 66°	Magnetic Electro. Magnetic Magnetic Magnetic Magnetic Magnetic Magnetic Magnetic Magnetic	12N 12L 12N 12D 12D 12D 12D 12D 12D 12N 12N	19% 6 19% 6 19% 6 19% 6 22 22 22 22 22 22 21% 21% 8	1234×151/2 1213/32×151/2 1213/32×151/2 183/4 183/4 183/4 183/4 183/4 193/4	10%x14½ 10%x14½ 10%x14½ 1734x14¼ 1736 1736 1736 1736 1736 1736 1736 1736	711/6 711/6 711/6 711/6 73/6 73/6 73/6 73/6 73/6 73/6 73/6	500-750 750-1500 500-750 	Cavity Cavity Cavity Rim Rim Rim Rim Cavity Cavity	Single Single Single Single Single Single Single Single Double	14,000 16,000 18,000 19,000 19,000 19,000 19,000 17,000 17,000	410 500 500 410 410 410 410 410 410 410	12,000 14,000 16,000 12,000 12,000 12,000 15,000 15,000 13,000	•	250 300 300 300 300 300 300 300 250 250	-33 to -66 -33 to -77 -33 to -77 -36 to -63 -26 to -63	110 — 100 140 140 140 115 115 140 146	17UP4 17VP4 17YP4 19AP4 19AP4 19AP4 19AP4 19AP4 19DP4
19EP4 19FP4 19GP4 19JP4 19GP4 20BP4 20CP4 20CP4A* 20CP4B* 20CP4C	G, S, Ro G, S, Ro G, S, Re G, S, Re C, S, Re G, S, Re G, S, Re G, S, Re G, S, Re G, S, Re G, S, Re	Glass Glass Glass Glass Glass Glass Glass Glass Glass	Alum.	65° 66° 66° 66° 54° 66° 66° 66°	Magnetic Magnetic Magnetic Electro. Magnetic Magnetic Magnetic Magnetic Magnetic	12D 12D 12D 12D 12L 12D 12D 12D 12D 12D 12D	211/2 221/3 21/3/6 21/3/6 21/3/6 21/3/6 21/3/6 21/3/6 21/3/6 21/3/6	137/52×171/6 19 19 135/6×173/6 135/6×173/6 203/6 151/6×1813/6 151/6×1813/6 151/6×1813/6	12×16 1736 1736 12×16 12×16 18 1234×17 1234×17 1234×17 1234×17	711/16 77/8 71/6 73/6 711/16 81/4 73/6 73/6 73/6 73/8	No Coating No Coating No Coating No Coating No Coating No Coating No Coating No Coating No Coating No Coating	Cavity Cavity	Single Double Single Single Single None Single Single Single Single	19,000 19,000 19,000 18,000 18,000 16,500 18,000 18,000 18,000	410 410 410 410 410 750 410 410 410 410	13,000 13,000 13,000 12,000 12,000 12,000 12,000 12,000 12,000 12,000 14,000–18,000		250 250 250 300 300 250 300 300 300 300 300	-26 to -63 -26 to -63 -27 to -63 -33 to -77 -33 to -77 -25 to -70 -33 to -77 -33 to -77 -33 to -77 -33 to -77	95 110 to 130 110 to 130 95 — 135 95 95 95 95 95 95	196P4 19FP4 19GP4 19JP4 19QP4 20GP4 20GP4 20GP46 20GP46

Text 1			TO S	Deflec-					Min.		Capacitance	50000	- HARRIST	Max.	Ratings†	CITY OF A	Typical Operati	on and Ch	procteristics		
Type	Face-plate	TO DESCRIPTION OF	STATES OF	tion Angle	2KS-2 (el) (p.	PAGE 10	Mox.	Max. Diameter	Useful Screen	Max.	(µµf)	100	Percent.	Applied	Voltages		Applied Voltages		Grid No. 1	Focusing Coll	Туре
No.	Description (See Notes)	Envelope	Screen	(Ap- prox.)	Focusing	Basing	Over-all Length (in.)	or HI.xWd. (in.)	Diam. or Ht.xWd. (in.)	Neck Length	Bulb Coating and Anode Min. Max.	Bulb Contact	lon Trop	Anode	Grid No. 2	Anode	Focusing Electrode	Grid No. 2	(Visual Cut-off)	(ma.) (approx.)	No.
20CP4D* 20DP4A* 20DP4A* 20DP4B* 20DP4C* 20FP4 20GP4 20HP4A* 20HP4A*	G, S, Re G, T, S, Re	Glass Glass Glass Glass Glass Glass Glass Glass Glass Glass	Alum Alum Alum	65° 65° 66°	Magnetic Magnetic Magnetic Magnetic Electro. Electro. Electro. Electro. Electro.	12N 12D 12N 12D 12N 12M 12L 12M 12L 12M	2113/16 213/4 213/4 221/8 221/8 221/8 221/8 221/8 221/8 221/8	151/(6×1813/6 151/(6×1813/6 151/(6×1813/6 151/(6×1813/6 151/(6×1813/6 151/(6×1813/6 151/(6×1813/6 151/(6×1813/6 151/(6×1813/6	1234×17 1234×17 1234×17 1234×17 1234×17 134×17/4 134×17/4 1234×17 1234×17 1234×17	736 711/16 711/16 711/16 711/16 711/16 711/16 711/16 711/16	500-750 No Coating 500-750 No Coating 500-750 No Coating 500-750 No Coating 750-1500 No Coating	Cavity Cavity Cavity Cavity Cavity Cavity Cavity	Single Single Single Single Single Single Single Single Single Single	18,000 18,000 18,000 18,000 18,000 18,000 16,000 16,000 16,000	410 410 410 410 410 410 410 500 500 500 500	12,000 12,000 12,000 16,000 16,000 12,000 14,000 14,000 14,000 14,000	2300 to 3200 2750 to 3740 -56 to +310 -56 to +310	300 300 300 300 300 300 300 300 300 300	-33 to -77 -33 to -77 -33 to -77 -28 to -72 -28 to -72 -33 to -77 -33 to -77 -33 to -77 -33 to -77 -33 to -77	95 95 95 95 95 95 —————————————————————	20CP4D* 20DP4 20DP4A* 20DP4B* 20DP4C* 20FP4 20 GP4 20HP4 20HP4A* 20HP4B
20HP4C* 20HP4D* 20JP4 20LP4 20MP4 21ACP4 21ACP4 21ALP4 21ALP4A* 21ALP4A*	G. G	Glass Glass Glass Glass Glass Glass Glass Glass Glass Glass	Alum Alum Alum Alum Alum	66° 66° 66° 85° 85° 65° 85°	Electro. Electro. Auto-Electro Electro. Electro. Magnetic Electro. Electro. Electro. Electro. Electro. Electro.	12M 12L 12P 12L 12L 12N 12N 12M 12L 12L 12L	221/8 221/8 221/8 221/8 221/8 203/6 203/6 203/6 207/6 207/6 207/6	15½x18½ 15½x18½ 15½x18½ 15½x18½ 15½x18½ 15½x18½ 16½x20¾ 16½x20¾ 15½x20¾ 15½x20½ 16½x20½ 16½x20½ 16½x20½ 16½x20½ 16½x20½ 16½x20½	1234×17 1234×17 1234×17 1334×17 1234×17 1234×17 1476×1815/16 1476×1815/16 143/16×191/6 15×191/6 15×191/6	711/6 711/6 711/6 711/6 711/6 711/6 711/6 711/6 711/6 711/6 711/6	No Coating 570-1500 500-750 750-1500 500-750 500-750 No Coating 500-750 500-750 500-750 500-750	Cavity Cavity Cavity Cavity Cavity Cavity Cavity Cavity Cavity Cavity Cavity Cavity	Single Single Single Single Single Single Single Single Single Single Single Single	16,000 16,000 18,000 16,000 20,000 20,000 18,000 18,000 18,000 20,000	500 500 500 500 500 500 500 500 500 500	14,000 14,000 12,000 14,000 14,000 16,000 16,000 16,000 14,000 14,000 14,000	-56 to +310 -56 to +310 0 -55 to +300 -64 to +350 -55 to +300 -55 to +300 -55 to +300	300 300 300 300 300 300 300 300 300 300	-28 to -72 -28 to -72 -33 to -77 -33 to -77 -33 to -77 -28 to -72 -28 to -72 -33 to -72 -28 to -72 -28 to -72 -28 to -72 -28 to -72 -28 to -72	117 117 117	20HP4C* 20HP4D* 20JP4 20LP4 20MP4 21ACP4 21ACP4A 21ACP4 21ALP44 21ALP4A 21ALP4A
21 AMP4 21 AMP4A 21 AMP4A 21 AMP23A 21 ANP4 21 AP4A 21 AP4 21 AQP4 21 AQP4 21 ARP4 21 ARP4		Glass Glass Glass Glass Metal Glass Glass Glass Glass	Alum. Alum. Alum. Alum.	85° 85° 85° 66° 85° 85° 65°	Magnetic Magnetic Magnetic Electro. Electro. Magnetic Magnetic Int. Magnetic Int. Magnetic	12N 12N 12N 12M 12M 12D 12D 12D 12D 12D 0 12N	207/16 207/16 207/16 207/16 207/16 225% 207/16 207/16 2313/32 2313/32	169/16×207/16 169/16×207/16 169/16×207/16 169/16×207/16 157/16×1927/16 157/16×207/16 169/16×207/16 159/16×207/16 151/16×203/16	15x19½ 15x19½ 15x19½ 15x19½ 15x19½ 15x19½ 15x19½ 15x19½ 15x19½ 143/6x19½ 143/6x19½	711/6 711/6 711/6 711/6 711/6 711/6 711/6 711/6 711/6 711/6	500-750 500-750 500-750 No Coating No Coating No Coating No Coating 500-750 500-750	Cavity Cavity Cavity Cavity Cavity Rim Cavity Cavity Cavity Cavity Cavity	Single Single Single Single Single Single Single Single Internal None	18,000 18,000 18,000 18,000 18,000 18,000 18,000 18,000 20,000	500 500 500 500 500 500 500 500 500 500	16,000 16,000 14,000 14,000 14,000 14,000 16,000 16,000 16,000		300 300 300 300 300 300 300 300 300 300	-28 to -72 -28 to -72 -33 to -77 -28 to -72 -28 to -72 -33 to -77 -28 to -72 -28 to -72 -28 to -72 -28 to -72 -28 to -72	102 102 102 ————————————————————————————	21 A M P 4 21 A M P 4/ 21 A M P 23 21 A N P 4 21 A P P 4 21 A Q P 4/ 21 A Q P 4/ 21 A Q P 4/ 21 A R P 4 21 A R P 4
21ASP4 21ATP4* 21ATP4A 21AUP4 21AUP4A* 21AUP4B 21AVP4 21AVP4A* 21AVP4B	G, S, Re G, S, Re	Glass Glass Glass Glass Glass Glass Glass Glass Glass	Alum. Alum. Alum. Alum. Alum.	66° 85° 85° 67° 67° 67° 67° 67°	Electro.	12M 12L 12L 12L 12L 12L 12L 12L 12L	225/8 203/8 203/8 2313/32 2313/32 2313/32 2313/32 2313/32	151/ ₁₆ ×1813/ ₁₆ 169/ ₁₆ ×207/ ₁₆ 169/ ₁₆ ×207/ ₁₆ 161/ ₂ ×203/ ₈ 161/ ₂ ×203/ ₈	1234x17 15x191/8 15x191/8 15x191/8 15x191/8 15x191/8 15x191/8 15x191/8 15x191/8	711/16 711/16 711/16 711/16 711/16 711/16 711/16 711/16 711/16	No Coating 1200-1500 1200-1500 500-750 500-750 500-750 1200-1500 1200-1500 1200-1500	Cavity Cavity Cavity Cavity Cavity Cavity Cavity Cavity Cavity Cavity	Single Single Single Single Single Single Single Single Single	18,000 18,000 20,000 18,000 18,000 20,000 18,000 20,000	410 500 500 500 500 500 500 500 500 500	16,000 16,000 16,000 18,000 18,000 18,000 18,000 18,000 18,000	-64 to +352 -64 to +350 -64 to +350 -72 to +396 -72 to +396 -72 to +396 -72 to +396 -72 to +396 -72 to +396	300 300 300 300 300 300 300 300 300	-28 to -72 -28 to -72	111111111	21 A SP4 21 A TP4* 21 A TP4 21 A UP4 21 A UP4 21 A UP4 21 A VP4 21 A VP4 21 A VP4
21AWP4* 21AYP4 21BAP4 21BCP4 21BDP4 21BNP4 21DP4 21EP4	G, S, Re G, S, Re G, S, Re G, S, Re G, S, Re G, S, Re G, F, S, Re G, Cy, Re	Glass Glass Glass Glass Glass Glass Metal Glass	Alum. Alum. Alum. Alum.	67° 66° 85° 65° 67° 85° 66° 66°	Magnetic Electro. Electro. Electro. Electro. Electro. Electro. Magnetic	12N 12L 12L 12L 12L 12L 12L 12M 12D	2313/32 225/6 203/6 2313/32 2313/32 203/6 225/6 233/6	16%(6×207/16 151/16×1813/16 161/2×203/8 1511/16×203/8 161/2×203/8 161/2×203/8 157/16×19 ²⁷ /32 153/4×207/16	15x191/8 123/4x17 15x191/8 143//6x203/8 15x191/8 15x191/8 1311/6x181/8 133/6x191/8	711/16 711/16 711/16 711/16 711/16 711/16 711/16 711/16	750-1500 750-1500 500-750 500-750 500-750 1200-1500 No Coating	Cavity Cavity Cavity Cavity Cavity Cavity Rim Cavity	Single Single None None None Single Single	18,000 18,000 20,000 20,000 20,000 20,000 18,000 18,000	500 410 500 500 500 500 500 500	16,000 16,000 16,000 16,000 16,000 16,000 14,000-18,000 16,000	-64 to +352 0 to 500 +50 to +550 +50 to +550 0 to 500 2750 to 3740	300 300 300 300 300 300 300 300 300	-28 to -72 -28 to -72 -28 to -72 -28 to -72 -28 to -72 -28 to -72 -28 to -72 -33 to -77 -33 to -77	95 95	21 AWP4 21 AYP4 21 BAP4 21 BAP4 21 BAP4 21 BAP4 21 DP4 21 EP4
21EP4A* 21EP4B* 21FP4 21FP4A* 21FP4C* 21JP4 21JP4 21KP4 21KP4 21KP4 21KP4 21KP4 21KP4 21KP4	G, Cy, Re G, Cy, Re	Glass Glass Glass Glass Glass Glass Glass Glass Metal Glass	Alum.	65° 65°	Magnetic Magnetic Electro. Electro. Int. Magneti Int. Magnetic Auto-Electro. Auto-Electro. Magnetic	12N 12D	23% 23% 23% 23% 23% 231% 2313/32 2313/32 2314 233/8 225/8	1534×207/16 1534×207/16 1534×207/16 1534×207/16 1534×207/16 1534×207/16 1534×207/16 1534×207/16 1511/16×2111/32 1511/16×2111/32 151/16×1813/16	1376×191/6 1376×191/6 1376×191/6 1376×191/6 1376×191/6 1376×191/6 1376×191/6 1376×191/6 1376×191/6 1376×191/6 1376×191/6 1376×183/6	711/6 711/6 711/6 711/6 711/6 711/6 711/6 711/6 711/6 711/6 711/6 711/6	500-750 500-750 No Coating 500-750 500-750 500-750 No Coating 500-750 500-750	Cavity Cavity Cavity Cavity	Single Single Single Single Single Internal Internal Single Single Single Single	18,000 18,000 18,000 18,000 18,000 20,000 20,000 18,000 18,000 16,000 18,000	500 500 500 500 500 500 500 410 500 410	16,000 16,000 14,000 14,000 14,000 14,000 14,000 14,000 12,000 14,000–16,000		300 300 300 300 300 300 300 300 300 300	-33 to -77 -33 to -77 -33 to -77 -33 to -77 -28 to -72 -33 to -77 -28 to -72 -33 to -77 -33 to -77 -33 to -77 -38 to -77	95 116 100	21EP4A* 21EP4B* 21FP4 21FP4A* 21FPAC* 21JP4A 21KP4 21KP4 21KP4 21KP4 21KP4
21WP4A* 21XP4 21XP4A* 21YP4	G, S, Ro G, S, Ro G, S, Re G, S, Re	Glass Glass Glass Glass	Alum.	66° 66° 66° 65°	Magnetic Electro. Electro. Electro.	12N 12L 12L 12L	2213/16 2256 2213/16 2338	15 ¹ / ₁₆ ×18 ¹³ / ₁₆ 15 ¹ / ₁₆ ×18 ¹³ / ₁₆ 15 ¹ / ₁₆ ×18 ¹³ / ₁₆ 15 ³ / ₄ ×20 ⁷ / ₁₆	1234×17 1234×17 1234×17 143/16×191/8	711/16 711/16 711/16 711/16	500-750 500-750 500-750 500-750	Cavity Cavity Cavity Cavity	Single Single Single Single	18,000 18,000 18,000 18,000	500 410 500 500	16,000 16,000 16,000 14,000 18,000	-64 to +352 -64 to +352 -55 to +300 -72 to +396	300 300 300 300 300	-28 to -72 -28 to -72 -28 to -72 -33 to -77 -33 to -77	100	21WP4A 21XP4 21XP4A 21XP4A
21YP4A* 21ZP4 21ZP4A* 21ZP4B* 22AP4	G, S, Re G, S, Re G, S, Re G, S, Re C, S, Ro	Glass Glass Glass Glass Metal	Alum.	65° 65° 65° 67° 70°	Electro. Magnetic Magnetic Magnetic Magnetic	12L 12D 12N 12N 12D	23% 23% 23% 23% 2313/32 233%	1511/16×203/8 153/4×207/16 1511/16×203/6 1511/16×203/8 2113/16	143/ ₁₆ ×191/ ₈ 137/ ₆ ×191/ ₈ 143/ ₁₆ ×191/ ₉ 143/ ₁₆ ×191/ ₈ 201/ ₄	711/16 711/16 711/16 711/16 75/16	500-750 No Coating 500-750 500-750	Cavity Cavity Cavity Cavity Rim	Single Single Single Single Single	18,000 18,000 18,000 18,000 19,000	500 500 500 500 410	16,000 12,060 16,000 16,000 14,000	-72 to +396 -64 to +350 - /	300 300 300 300 300 300	-33 to -77 -28 to -72 -33 to -77 -33 to -77 -33 to -77 -33 to -77	95 100 117 118	21YP4A* 21ZP4 21ZP4A* 21ZP4B* 22AP4

Bold-face type highlights the important characteristics that differ among similar Tube Types having different suffix letters.

NOTES:
All tubes in this section have heater ratings of 6.3 volts and 0.6 ampere. Only tubes that are magnetically deflected are included.
Face-Plate Code: C — clear, Cy — cylindrical, F — frosted, G — gray, Re — rectangular, Ro — round, S — sphencal, T — treated.

† Design-center values.

#Internal magnetic unit to be used with external tubular magnetic shield.

#For rectangular tubes, the horizontal deflection angle is given.



MONOCHROME SECTION

TELEVISION PICTURE TUBES

9190		100 100					10 1 20	E THE CEN	Min.	1 10	Capacitance	10	1955 J. 95	Max. I	Ratings†	10000	Typical Operation	on and Ch	practeristics		1119
518		2 8		Deflec- tion	Sill Yilden	Bispie	2. 49	Mox. Diameter or Ht.xWd. (in.)	Useful Screen	Max.	(μμη)	18	San E	Applied	Voltages	14,000	Applied Voltages	200 30	Grid No. 1	Focusing	Type
Type No.	Face-plate Description (See Notes)	Envelope	Screen	(Ap- prox.)	Focusing	Basing	Max. Over-all Length (in.)		Diam. or Ht.xWd. (in.)	Neck Length	Bulb Coating and Anode Min. Max.	Bulb Contact	lon Trop	Anode	Grid No. 2	Anode	Focusing Electrode	Grid No. 2	(Visual Cut-off)	Coil Current (ma.) (approx.)	No.
22AP4A 24AP4 24AP4A 24AP4B 24BP4 24CP4 24CP4A* 24CP4A* 24DP4A* 24DP4A*	G, S, Ro G, S, Ro G, S, Ro G, S, Ro G, S, Re G, S, Re G, S, Re G, S, Re G, S, Re	Metal Metal Metal Metal Glass Glass Glass Glass Glass	Alum.	70° 70° 70° 70° 70° 85° 85° 85° 85° 85°	Magnetic Magnetic Magnetic Magnetic Electro. Magnetic Magnetic Electro. Electro. Magnetic	12D 12D 12D 12D 12M 12M 12N 12N 12L 12L	23% 247/16 247/16 247/16 243/4 211/2 211/2 211/2 211/2	2113/16 241/4 241/4 241/4 241/4 241/6 189/16×2211/16 189/16×2211/16 189/16×2211/16 189/16×2213/16	201/4 221/8 221/8 221/8 221/4 163/4×21/4 163/4×21/4 163/4×21/4 163/4×21/4	75/16 711/32 711/32 711/32 711/32 711/16 711/16 711/16 711/16		Rim Rim Rim Rim Cavity Cavity Cavity Cavity Cavity	Single Single Single Single Single Single Single Single Single Single Single	19,000 16,000 16,000 16,000 16,000 20,000 20,000 20,000 20,000 18,000	410 410 410 410 500 500 500 500 500 500 500	14,000 15,000 15,000 15,000 14,000 18,000 16,000 16,000 16,000		300 300 300 300 300 300 300 300 300 300	-33 to -77 -33 to -77 -28 to -72	114 114 114 115	22AP4A 24AP4 24AP4A 24AP4B 24BP4 24CP4 24CP4 24CP4A* 24DP4A* 24QP4
24TP4* 24VP4 24VP4A* 24XP4 24XP4 24XP4 27XP4 27XP4 27XP4 27XP4 27XP4 27XP4	G, S, Re G, S, Re G, S, Re G, S, Re G, S, Re G, T, S, Re G, S, Re G, S, Re G, S, Re G, S, Re G, S, Re G, S, Re	Glass Glass Glass Glass Glass Glass Metal Glass Glass Glass Metal	Alum. Alum. Alum. Alum. Alum.	85° 87° 87° 85° 85° 85° 85° 85° 85° 85° 85°	Magnetic Magnetic Magnetic Magnetic Electro. Electro. Magnetic Magnetic Magnetic Magnetic Magnetic	12N 12N 12N 12D 12L 12L 12L 12D 12D 12D 12D 12D	211/2 211/2 211/2 211/2 211/2 211/2 211/2 223/16 237/16 2447/64 223/16	187/e×2211/je 189/e×223-l/e4 189/e×223-l/e4 189/e×223-l/e 189/e×223-l/e 189/e×223-l/e 201/ex253-l/e 2013/ex253-l/e 2015/ex253-l/e 2016/ex253-l/e	171/6x217/6 161/6x213/6 161/6x213/6 163/4x211/6 163/4x211/6 18/6x231/6 18/2x24 18/6x24/6 18/5x24/6 18/5x2317/6 18/5x2317/6	711/6 711/6 711/6 711/6 711/6 711/6 711/6 711/6 711/6 711/6 711/6 711/6	250-750 750-1500 750-1500 No Coating 1200-1500 500-750 No Coating No Coating 250-400	Cavity Cavity Cavity Cavity Cavity Cavity Rim Cavity Cavity Cavity Cavity Cavity Cavity	Single Single Single Single Single None Single Single Single Single Single Single	20,000 22,000 22,000 20,000 20,000 20,000 20,000 20,000 22,500 22,000 18,000	500 600 500 500 500 500 500 500 500 500	14,000 20,000 18,000 16,000 16,000 16,000 16,000 16,000 16,000 16,000 16,000		300 300 300 300 300 300 300 300 300 300	-33 to -77	125	24TP4* 24VP4 24VP4A* 24VP4 24YP4 24YP4 27ZP4 27ZP4* 27ZP4* 27ZP4 27ZP4 27ZP4
27NP4 27RP4* 27SP4 27UP4 30BP4	G, S, Re G, S, Re G, S, Re G, S, Re G, S, Ro	Glass Glass Glass Glass Metal	Alum. Alum.	85° 85° 85° 85° 90°	Magnetic Magnetic Electro. Electro. Magnetic	12N 12N 12L 12L 12L	237/16 237/16 237/16 237/16 241/16	2013/32×2513/32 2013/32×2515/32 2013/32×2515/32 303/8	18½x24¼ 18½x24 18½x24 18½x24 28¼	711/16 711/16 711/16 711/16 73/8	500-750 500-750 500-750 500-750	Cavity Cavity Cavity Cavity Rim	Single Single Single Single Single	18,000 20,000 20,000 20,000 30,000	500 500 500 500 410	16,000 16,000 18,000 16,000 12,000	 -72 to +396 0 to 396	300 300 300 300 300 300	-28 to -72 -33 to -77 -28 to -72 -28 to -72 -33 to -77	95 105 — — 95	27NP4 27RP4* 27SP4 27UP4 308P4

Bold-face type highlights the important characteristics that differ among similar Tube Types having different suffix letters.

NOTES:
All tubes in this section have heater ratings of 6.3 volts and 0.6 ampere. Only tubes that are magnetically deflected are included.

Face-Plate Code: C—clear, Cy—cylindrical, F—frosted, G—gray, Re—rectangular, Ro—round, S—spherical, T—treated.

† Design-center values.

† Internal magnetic unit to be used with external tubular magnetic shield.

§ For rectangular tubes, the horizontal deflection angle is given.

COLOR SECTION

13440	FERM	1	91000	Defiec-	FIELD .	Con- vergence	1 300		MARCH.	Min.	1 5 6 7	Capacitance	Comp. See	Max. R	atings†		Typical Operati	ons and Characte	ristics	17X-111	
Type No.	Face-Plate	- AT	Ser Alumb	tion	Elexan		150	Mox.	Max.	Max. Useful		between	CHINA DE	Applied	Voltages		Арр	led Voltages	100	Grid No. 1*	3704
	tion (See Notes)	Envelope	Screen	(Ap- prox.)	Focusing		Basing	Over-all Length (in.)	or Ht.xWd. (in.)	Diam. or Ht.xWd. (in.)	Neck Length (in.)	Coating and Anode Min. Max.	Bulb Contact	Anode	Grid No. 2	Anode	Focusing Electrode*	Convergence Electrode f	Grid No. 2	(Visual Cut-off)	Type No.
15GP22 15HP22 19TP22 19VP22* 21AXP22	C, S, Ro C, S, Ro G, S, Ro G, S, Ro G, S, Ro		Flat, Alum. Sph. I, Alum. Sph. I, Alum. Sph. I, Alum. Sph. I, Alum.	60° 62°	Electro. Electro.	Electro. Electro. Electro. Magnetic Magnetic	15GP22 15HP22 19TP22 14W 14W	261/8 261/8 243/4 267/16 255/16	1534 1534 204/s 2027/32 211/4	8%x11½ 12 12 ⁷ / ₁₆ x16%a 13%x17½ 15¼x19%a	10% 1018/32 93/32 1025/32 929/32	1500-2500 1500-3000 1500-3000	Metal-flange Metal-flange Metal-flange Metal-flange Metal-shell lip	20,000 20,000 22,000 27,000 25,000	500 500 500 500 800	20,000 20,000 20,000 25,000 25,000	3100	8500 to 10,200	240	-45 to -100 -45 to -100 -42 to -78 -45 to -100 -45 to -100	15GP22 15HP22 19TP22 19VP22* 21AXP22

All tubes in this section contain three electron-beam sources with heater ratings of 6.3 volts and 1.8 amperes total current (heaters electrically paralleled within the tube). The screens of the tubes in this section are of the tri-color (red, green, and blue), phosphor-dot type with an associated shadow mask containing uniformly spaced perforations (one for each triad).

All tubes in this section are magnetically deflected.

Face-Plate Code: C — clear, G — gray, Ro — round, S — spherical.

For each of the three electron-beam sources.

For each of the three electron-beam sources.

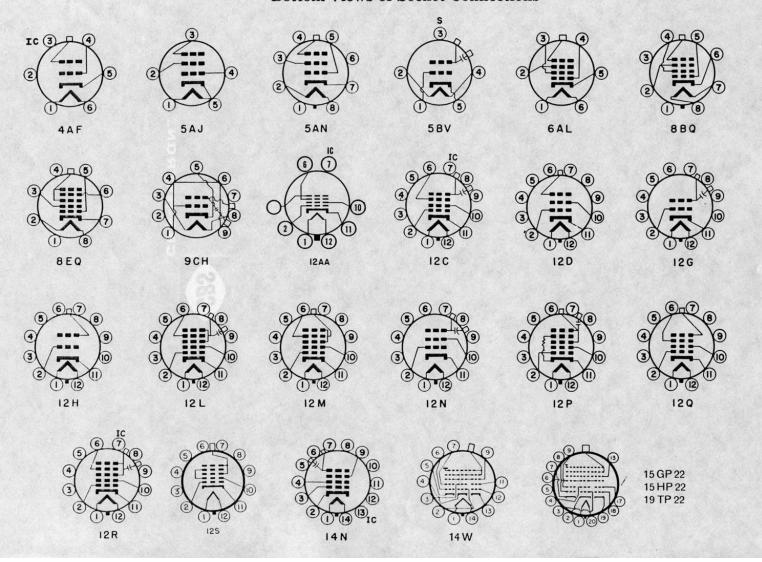
For each of the three electron-beam sources.

Floses not include the dynamic convergence component. tScreen on inner surface of face-plate.

The data in this reference guide have been compiled with the utmost care as to technical accuracy from sources we believe to be authoritative and reliable. / CBS-Hytron, however, cannot assume any liability or obligation for the use or application of these data.

BASING DIAGRAMS

Bottom Views of Socket Connections



Courtesy of John Folsom